

# Managing Linux and Windows Clients Equally.

**VERDE VDI™ Provides a Solution for Heterogenous Environments Without Additional Effort or Investment.**

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## Linux Gains Momentum

Twenty years after its introduction, Linux has become a major player in enterprise data centers and on enterprise desktops. According to a [Goldman Sach's report](#), Windows is being unseated as the dominant choice of operating system for computing devices. The [Gartner Forecast: Devices by Operating System and User Type](#) was recently updated to reflect a prediction that PC shipments would decrease by almost ten percent, while tablet shipments would increase by more than 50 percent into 2014. Where Windows has dominated as the operating system of choice for PCs, Linux is a top choice for this growing category of mobile devices.

Faced with the growing need to support a BYOD (bring-your-own-device) culture, combined with a [shifting mix of computing devices](#), companies of all sizes, government agencies, and schools are faced with deploying Linux in combination with other operating systems.

That brings many benefits, but when it comes to Virtual Desktop Infrastructure (VDI), it can also introduce challenges. If a VDI solution does not support both Windows and Linux – and most VDI solutions uniformly do not without outside help – then the organization can find itself turning to complex and expensive third-party solutions in order to make VDI work across all desktops.

Moreover, a successful VDI solution must be able to deliver both Windows and Linux user desktops to all of the most popular endpoint computing devices, including PCs, Macs, thin clients, netbooks, tablets and smartphone devices. As the use of portable network-connected devices such as tablets and smart phones rocket, *NComputing* addresses the Windows-Linux desktop mix by allowing organizations to run both Linux and Windows 7 in parallel, along with legacy Windows XP desktops. *NComputing VERDE VDI™* solution does this by leveraging a gold master image that standardizes the operating systems and applications management, while retaining user personalization – a tremendous leap beyond other VDI solutions based around Windows.

## The Traditional Challenges of VDI

Regardless of what sort of desktops the enterprise must support, there are three major challenges with VDI technology—cost, complexity and coverage. Along with meeting the challenge of integrating Linux desktops, *NComputing* addresses each of “the three Cs.”

### Cost

Every VDI vendor makes a case for savings in total cost of ownership. Unfortunately, the initial capital expense costs can be so high that organizations are hesitant to try the technology. For organizations to begin using VDI, the initial cost must be competitive with that of a PC refresh cycle. Because we built **VERDE VDI** specifically for VDI, it is far easier to get up and running, and results in huge capital expenditure savings over competitive solutions. Thanks to innovative technologies around storage optimization in particular, a *NComputing VERDE VDI* solution costs a third to half that of competing solutions.

### Complexity

The second C is complexity. Competing solutions are often a mix of third-party components, either pieced together through technology acquisitions, or requiring you to purchase additional parts. That results in technology that is poorly integrated, and difficult to deploy and manage. We built the stack of unified technology in **VERDE VDI** specifically for virtual desktops. **VERDE VDI** is an end-to-end solution, complete with everything for onsite, branch and mobile management capabilities in one software package. There are no additional components to buy.

### Coverage

This issue stops many VDI deployments at the pilot stage, when organizations realize that traditional VDI solutions simply do not address enough use cases to be useful. To address this, *NComputing* provides integrated onsite and integrated branch VDI—the only vendor to do so.

## Linux and Windows: Equally Important

*NComputing* treats Windows and Linux virtual desktops as equally important right from the start—the only vendor to do this without third-party add-ons. You can deploy **VERDE VDI** as a 100% Linux-based solution that can serve both Windows and Linux virtual desktops. **VERDE VDI** is a unified, full-coverage stack, with licensing designed for deployment in any combination, depending on organizational needs.

Moreover, you can deploy **VERDE VDI** as a hosted solution or on-premises without changing the management model.

## VERDE VDI and Linux in the Data Center

In the *NComputing* data center, as shown in Figure 1, the **VERDE VDI Core** and the **VERDE VDI Console** serve up and manage VDI, using either a LAN or WAN, and to wired or wireless devices. The data center architecture for any *NComputing* data center, including one that includes Linux, consists of the **VERDE VDI Core**, which forms the **VERDE VDI cluster**, and the **VERDE VDI Console**, which handles management. The cache-and-proxy model shown can continue to serve virtual desktops even if the link to the data center is broken.

In this illustration, the **VERDE VDI Core** consists of building-block components of Linux-based servers that scale out horizontally. The **VERDE VDI** solution can run on a single server, or can scale up to thousands.

**VERDE VDI Branch** extends the decentralized VDI model to on-premise nodes with no administrative footprint, giving organizations with remote offices the benefits of both WAN optimization and business continuity.

### Data Center Architecture

- VERDE VDI CORE (leveraging Linux and KVM)
- VERDE VDI Management Console
- Access via native GUI or REST API
- Runs directly on infrastructure, separate servers are not required
- Integration points for External Storage and AD

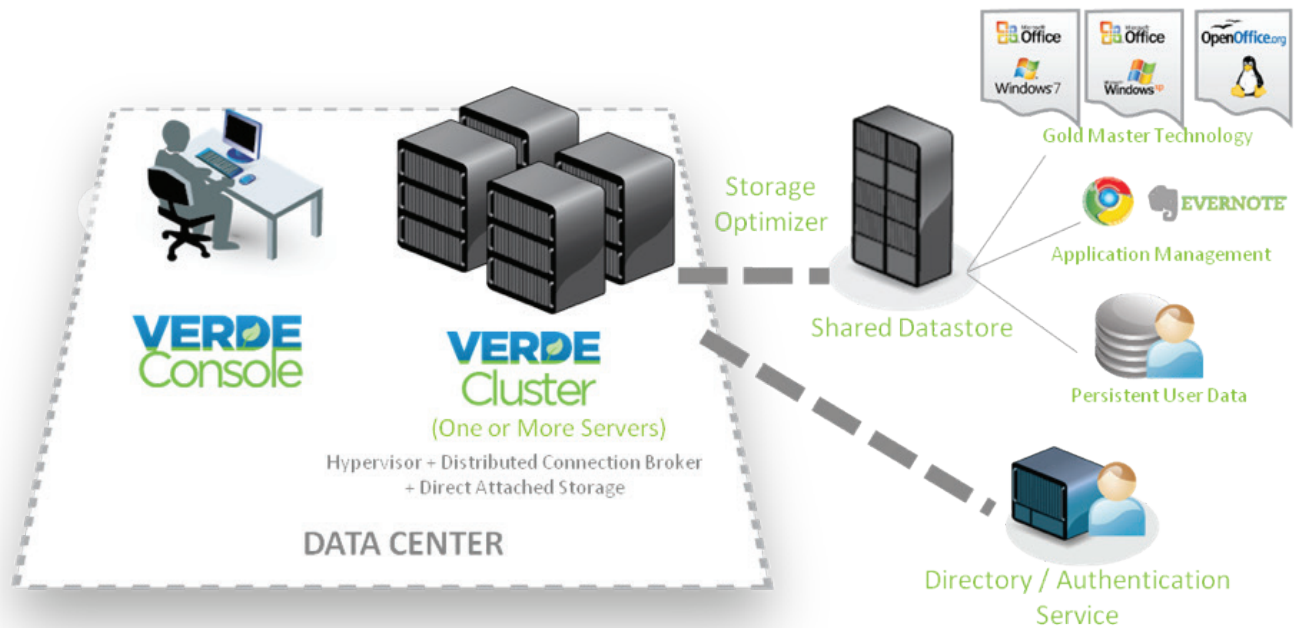


Figure 1: The VERDE VDI Core consists of building-block components of Linux-based servers that scale out horizontally.

## Management Console

The **VERDE VDI** Management Console manages the infrastructure, the virtual desktops, applications and infrastructure monitoring, both real-time and historical. It can be accessed in either of two ways: via a native GUI, accessible via a web browser, or via REST API, allowing integration with third party or in-house solutions via simple web services.

The management platform runs directly on the infrastructure, and does not require separate servers. **VERDE VDI** provides integration points for external storage and Active Directory.

## Storage Coverage

On the storage side, *NComputing* Storage Optimizer™ CacheIO™ technology reduces the IOPS required to serve virtual desktops by up to 90 percent by using local spindles or direct-attached storage (DAS) on the VDI nodes themselves. *NComputing*' gold master image management technology can consist of either Windows or Linux virtual desktops that provide separate system end-user space, so that user data is always persistent. (The IT organization manages system data.) Everything operates according to policies configured in the organization's enterprise directory systems (e.g. Active Directory, Oracle ID, eDirectory).

## VDI Delivery

With **VERDE VDI**, VDI delivery can be over the LAN or WAN using wired or wireless devices, including Pcs, laptops, thin clients, tablets and smartphones. The devices can be running Linux, Windows, or other operating systems. **VERDE VDI** gives the users choice in their protocols to optimize their experience based on the virtual machine they are connecting to. For Windows based virtual guests we recommend RDP but also provide SPICE as a secondary option. All guests may use either SPICE or the NX protocol.

**VERDE VDI** also supports USB device redirection and follow-me universal printing so that IT does not have to maintain print drivers on virtual desktops. Instead, everything initiates through a web-based access portal that IT can deliver to nearly any device.

## Supported Protocols

- **SPICE:** An open-source, high-definition, multimedia, multi-monitor protocol that works with Linux virtual desktops as well as Windows.
- **RDP:** Remote Desktop Protocol is owned by Microsoft and as of version 8 supports many different clients and form factors natively.
- **HTML5:** Supports cross-platform access to desktops including support for iOS, Android, Windows, Linux, Mac and most modern web browsers.

## Thin Clients, Windows and Linux

**VERDE VDI** leverages a thin client operating system to repurpose existing PCs, turning them into **VERDE VDI** thin clients. By providing support for Windows thin clients running virtual Linux desktops, **VERDE VDI** allows enterprises to repurpose existing hardware. This reduces capital expenses for desktop hardware.

## The Linux End-User Experience in VERDE VDI

The experience for a Linux-based user, like any user, begins with the web browser, where the user logs in with enterprise username and password, and perhaps domain. As shown in Figure 2, they then choose a desktop (if multiple desktops are provisioned) or a single desktop automatically starts up. The desktop experience can display either in a window on the administrator's desktop or in full-screen mode.



Figure 2: The user experience of initiating a desktop for a Red Hat virtual machine is running atop an Ubuntu desktop, from a Firefox browser in Windows mode.

## Summary

In selecting a VDI solution, a key consideration is the vendor's support of multiple operating systems. VERDE VDI delivers both Linux and Windows user desktops from the same platform, without requiring the addition of third-party software. There is no additional cost to this capability and there are no extra steps to having access to the functionality. As tablets, smartphones and other networked devices flood the enterprise, that ability is a key consideration in choosing a VDI solution. VERDE VDI supports any desktop in the enterprise, and is the only solution that truly solves the VDI challenges of cost, complexity and coverage.

## Additional Resources

### Articles

- [Understanding Successful VDI Implementation](#)
- [How Government Entities Can Deploy Linux and Windows Virtual Desktops](#)
- [Managing User Profiles within Traditional or Virtual Desktop Settings](#)

### Case Studies

- [Linux and VDI Security for the U.S. Department of Defense](#)

### Documentation

- [VERDE VDI Datasheet](#)

### Whitepapers

- [How VDI Secures Your Data](#)
- [Cut your Storage Costs in Half](#)

